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Sustainable Incubator Management— A Case Study for Pakistan

ANEEL SALMAN and ATIF ABDUL MAJEED

1. INCUBATORS

1.1. Historical Background

"There is broad recognition today that entrepreneurial, knowledge-based enterprises are prime creators of economic growth and that such ventures need special business development services" [Lalkaka (2000)]. Yet, about 80 percent of all start-up firms fail within the first five years of their genesis. This highlights a strong need of effective incubation facilities which compress the learning curves of the start-ups and provide them with necessary initial support in order to improve their survivability.

Incubators are considered as a means of providing special business development services. "A business incubator may be defined as an organisation which offers a range of business development services and access to small space on flexible terms, to meet the needs of new firms. The package of services offered by a business incubator is designed to enhance the success and growth rates of new enterprises thus maximising their impact on economic development" [Duff (1998), p. 11]. Although the idea of incubators was conceived in the 1950s, it did not see widespread acceptance until the 1980s. The mushroom growth of incubators, initiated in 1980s has resulted in over 1,400 incubators today in North America, with 1,115 in United States, 191 in Mexico and 120 in Canada [Knopp (2007)]. In 2005 alone, North American incubation programmes assisted more than 27,000 companies that provided employment for more than 100,000 workers and generated annual revenues of $17 billion (Ibid.). Because of the number of incubators and studies carried out on their performances, this background overview is predominantly based upon the US experiences with incubators and their best practices.

1.2. Types of Incubators

Incubators can be classified based on their main sponsoring agency, which in turn determines their main goals and objectives (Table 1).

Aneel Salman <salmaa@rpi.edu> is affiliated with the Department of Economics, Rensselaer Polytechnic Institute, New York, USA. Atif Abdul Majeed <atifmajeed83@gmail.com> is associated with the Lally School of Management and Technology, Rensselaer Polytechnic Institute, New York, USA.

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Table 1

Types of Incubators and their Main Objectives

Sponsor	Objectives
Technical University	Innovation, Faculty/ Student involvement
Research Institutions	Research Commercialisation
Government	Regional development, poverty alleviation, job creation
Private Sector	Profits, patents, spin-offs, image

Source: Lalkaka (2000).

Often incubators have multiple sponsors which leads to the convergence of multiple strengths but at the same time, diverse goals.

1.3. Incubator Services

Incubators can offer their clients a diverse range of services and guidance such as human resource management (team identification; capacity building and comprehensive business training programmes; basic presentation skills); day to day functional services (business ethics and etiquette; business basics like accounting/financial management); infrastructure provision (high speed internet access; computers), as well as external guidance in areas such as networking/lobbying (with other firms; higher education resources; strategic partners; advisory boards and mentors; brand marketing) and even in accessing funds (bank loans; guarantee programmes; angel investors or venture capital); and technology commercialisation assistance [Knopp (2007)]. These generic services offered by incubators are an indication of the specialised services which Academic Incubators (AIs) specifically offer as explained below:

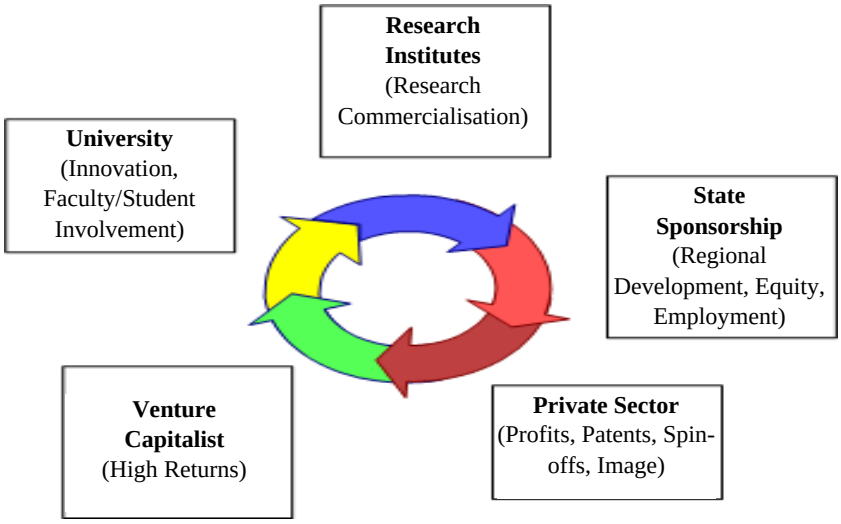
1.4. Real-Estate Focused Phase of Development

At the most basic level, AIs are expected to provide low-rent office space, internet/communication facilities, tax breaks and other similar incentives to start-up companies. The responsibilities of the incubator management teams are, therefore, restricted to rent collection, building maintenance and refurbishment of tenant services. However, the level of cooperation between the incubator management and the start-up company is expected to evolve to the much deeper and broader level of enterprise development so that the real benefit of the incubation process can be reaped.

1.5. Enterprise Development

The incubator management team is expected to provide enterprise development services to start-up companies. This includes creating a business consultancy value network, fully utilising resources and tremendous opportunities by the sponsors and the wide spectrum of skills available in the academic institutions in the form of faculty, students and lab resources. AIs should become a central node of this symbiotic value network, creating and maintaining an entrepreneurial synergy, and hence integrating the start-ups in this ecology-suppressing their learning curves and facilitating their graduation as full-fledged sustainable firms. This level of involvement could be depicted in the following Figure 1.

Fig. 1. Central Integrator Role of Academic Incubators



The figure shows the central role that AIs could play in bringing together different stakeholders with diverse goals and aligning their goals in such a fashion that a true entrepreneurial synergy could be formed-Extending Entrepreneurship to Intrapreneurship, fully capitalising the resources and aligning objectives of all the stakeholders so that not an "Intrapreneurial Value Network" can be formed. A network that would eventually be a reliable infrastructure that could provide the start-ups a buffer from initial mistakes, market vicissitudes, tough competition, and misjudged assumptions—ensuring a better survival rate of the start-ups which presently stands at merely 20 percent [Abetti (2004); Knopp (2007)].

2. WHY DO ACADEMIC INCUBATORS FAIL?

Most of the incubator facilities in the USA are public-private partnerships, with initial support coming from the federal, state and local government bodies. About 80 percent of these facilities operate as not-for-profit entities. Approximately half of these total facilities are affiliated with universities [Knopp (2006); NBIA (2009)].

Although most of the academic incubators (AIs) are reluctant to share their performance record openly, their success rate could be analysed independently based upon a number of parameters including:

(1) Number of enterprises created
(2) Survival rate of these incubated enterprises
(3) Jobs created
(4) Research commercialised
(5) Overall profitability of the incubator
(6) Improvement in the university-business links
(7) Faculty/student involvement
(8) Refinement of the entrepreneurial skills of the start-ups' management.

These performance parameters can help measure the effectiveness of the AI, their role as business laboratories, bridging the gap between universities and the industry. Unfortunately, most AIs fail to achieve their desired goals. Today, they rely incessantly on subsidies to survive. It is ironic that facilities created to improve start-ups' sustainability today struggle for their own survival, hence representing a poor model for the tenants. They continue to exist in isolation, not establishing any meaningful association with the academia. They have not been able to commercialise research on a broad scale. Neither have they been able to fully engage with the faculty or the students. As a result, the government and the universities are increasingly becoming frustrated and gradually withdrawing the subsidies which has placed the basic concept of AIs under question.

> "On average, nearly 75 percent of incubator managers' time is spent on non-incubator responsibilities and incubator real estate issues such as rent collection, maintenance and the management of refit or refurbishment of tenant spaces. A median of only 10 percent of incubator managers' time is spent working with tenants" [Duff (1998), p.12].

Given below are some of the reasons for the failure of academic incubators, especially in the USA. While no quantitative study of incubators in Pakistan could be conducted for this paper, personal communications and interviews with a handful of incubators housed in Pakistani universities, lead us to infer that these AIs face similar problems and cite the same reasons for failure.

2.1. Lack of Planning and Clear Vision

Factors contributing towards poor performance are mainly flaws in planning and operating AIs. The planning flaws include lack of a proper business plan. In many instances, universities start incubators without a proper need assessment and market analysis, or merely because other universities are doing it. It becomes a conventional symbol for a university to have an incubator. These incubators were later used as a means of boosting strong relationships with the industry whereas in reality, industries were never analysed or involved in the decision making process while taking these initiatives. It was not realised that there are certain environmental conditions which need to be satisfied before a successful academic incubator can be built in any area.

2.2. Poor Tenant Selection

As a result AIs ended up with companies which were not supposed to be there. Because of incubators' cash flow requirements, early tenants are likely to be chosen on their capacity to pay rent rather than their growth potential. Moreover, virtually no attention is paid to the alignment of companies' objectives and universities' vision. It is not unusual to find a company in an AI with a completely different scope, locating itself in the incubator only to avail low rent space and hence restricting the role of the incubator to a first tier, real-estate based association.

2.3. Inadequate Entrepreneurs

An inadequate pool of entrepreneurs also contributes towards poor performance. Incubators are often run by people who are never involved or have observed the process through which the start-ups have to go. As a result the companies locating themselves in

the incubators do not consult the incubator management as the experience of 'academic incubator managers' is seen as insufficient or irrelevant to them. The condition is further worsened due to the absence of an active board and a committed champion. Thus, incubator managers have to continuously struggle to muster political and financial support for their programmes.

2.4. Cultural Gap

The root cause of poor governance is lack of the appreciation of the culture gap between academia and the industry. Incubators are supposed to bridge the industry and the academia. Therefore, the management needs to include people from both of these segments; segments which are so much dependent on each other yet so distant culturally. While, AIs have to be affiliated with universities, they need not be administered by them. University administered incubators result in dormant, static, isolated buildings which try to call themselves incubators. The students interviewed at one of the top engineering universities in the USA called their incubator programme a 'cemetery of projects'.

2.5. Lack of Networking Opportunities

Another factor is the lack of proper networking opportunities. The universities have resources using which they could frequently hold seminars, exhibitions, training programmes, career fairs, and talks. All these events attract industry personnel to the universities and could be used to allow the incubated start-ups an access to industry leaders. Unfortunately, very little is thought and done regarding utilisation of these networking resources.

2.6. Undercapitalisation of In-house Resources

The most serious factor is the undercapitalisation of universities internal resources. These resources include: Faculty, Students and Laboratories.

Faculty members' experience could be of immense value to the entrepreneurs. Engineering and sciences' faculty have a remarkable knowledge base and ideas. Business faculty studies hundreds of start-up companies through case studies and has a philosophical knowledge about the process through which these companies have to go through. Unfortunately, the faculty does not get involved with the companies in the AIs.

2.7. Faculty-lack of Incentives

Faculty's lack of involvement is due to the lack of incentives—as they are expected to get involved voluntarily. This involvement is besides their teaching assignments. Therefore, it is taken as a burden by many of the faculty members and they prefer to stick to their teaching jobs. The result is a complacent faculty, settled in a comfort zone of academic environment, distant from the outside world activity, and preparing the workforce for industry which it has very little knowledge about.

2.8. Underutilised Student Workforce

Students are another resource which remains underutilised and undercapitalised by the incubated businesses. Students could bring creative energy which is a pivotal element

of entrepreneurial environment and that too at a lower cost than the external help. Yet no significant student internship initiative was found in majority of the academic incubators. As a result, the AIs end up losing this opportunity and the student graduates end up with the tag of 'fresh graduates', meaning graduates coming out directly from the universities, or to be more precise, graduates lacking any real or relevant industry experience. As a result either the industry feels reluctant to hire the 'fresh graduates' or else these highly talented, motivated and energetic engineers and scientists end up being exploited, accepting jobs at wages far less than what is a true reflection of their skill set.

2.9. Underutilised Laboratories

Finally, the expensive and valuable equipment available in universities also often remains inaccessible to the incubated companies. This is another serious undercapitalisation. Start-ups' main concern is lack of financial resources. Access to the labs in the universities could help the start-ups significantly keep down their costs. Moreover, it could result in a better utilisation of this equipment in the labs themselves. In many instances, equipment worth millions of dollars is either underutilised or not utilised at all in the labs. Mutual projects which could benefit both the start-ups in the incubators and the students in the universities are never carried out. As a result the labs remain unreachable to the incubators and continue to house rusting valuable equipment.

3. GOVERNMENT OF PAKISTAN'S HUMAN RESOURCE DEVELOPMENT INITIATIVE

At the beginning of this millennium, the Government of Pakistan (GoP) embarked on the arduous yet promising journey to make Pakistan's economy a knowledge-based economy. The idea was to embark on the same path as did Japan, Korea and China by focusing on human centred development. Many strategic measures were taken, including the establishment of the Higher Education Commission (HEC), major policy changes, manifold increases in the education budget, creation of a necessary infrastructure; all actions geared towards the design of a favourable environment for the birth and nourishment of a globally competitive industry and workforce. Major policy changes were made to attract foreign direct investment (FDI) in information technology (IT) and Telecom industry. This included giving a tax holiday to the IT industry until 2016, opening all sectors to FDI, allowing 100 percent foreign equity, waving any sorts of government sanctions for FDI in IT sector, fully protecting foreign investment and allowing 100 percent repatriation of profits to IT companies.

3.1. Positive Results

These measures coupled with the changing geo-economics of the region have shown positive results. Pakistan's young yet thriving 2 billion US$ IT industry has shown an average growth rate of 50 percent in the past five years. Pakistan's cellular industry has become one of the world's fastest growing cellular industries with an annual growth rate of 150 percent and telecom revenue growth of 20 percent. The annual IT human capital requirement increased more than 250 percent in five years, from 90,000 to 235,000 [PSEB (n.d)]. These achievements have been recognised internationally as well. Lehman Brothers described Pakistan as a country with the "best IT fundamentals of any

offshore outsourcing industry." And the strong growth prospects in this area are expected to attract further FDI in the coming years. "The software industry in Pakistan has enormous potential to grow from its current size. The worldwide IT services market is growing at the rate of eight percent in real terms and expected to reach about US$ 910 billion by 2010. Of this, about 54 percent will consist of hardware maintenance, IT management and other services" [Rahman, *et al.* (2005), p. 26].

3.2. Human Resource—Foreign Faculty Development Programme

The primary driver of these results is human capital. Recognizing the need for the improvement of the quality of our human capital, Higher Education Commission (HEC) started an ambitious foreign faculty development programme (FFDP), signing agreements with 28 technologically advanced countries and sending Pakistani scholars to those countries for a period of 2-5 years to pursue higher education in strategically selected fields and then requiring them to return back to Pakistan for a period of 3-5 years at least, to share and transfer their knowledge in Pakistani universities. The programme is running successfully and there is almost 80 percent return rate of these scholars who are showing impressive performances in the universities.

3.3. Next Step—Establishing Industry Links

The next phase of this human centric development requires the alignment of this highly qualified and motivated academic human capital with the industry. This involves "training professionals and workers in line with market demand; creating effective linkages among academic institutions, research centres, and industry; providing incentives to the private sector to invest in human resource development as well as to carry out research and development; and establishing technology incubators and specialised technology parks" [Rahman, *et al.* (2005)]. Thus, in order to fully utilise foreign qualified human resource and to effectively capitalise upon the investments made in higher education, incubators are needed which could weave together academia and the industry. "HEC should build on its very successful programmes in higher education and possibly expand its efforts over the next five years through capacity building projects, including centres of excellence, research centres" [USAID (2008)].

3.4. Academic Incubators—Hubs of Technological Entrepreneurship

In this paper, a business model which not only assures the successful management of incubators, but also aligns the objectives and incentives of the highly motivated and qualified young scholars who are returning under the foreign faculty development programme with the IT/engineering industry has been proposed. The main focus in the development of this model is FFDP scholars. Using this model, academic incubators can be transformed into central hubs of technological entrepreneurship. An average IT job costs $ 58,598 in the USA, $ 35,562 in India and $27,000 in Pakistan [PSEB (2006, 2007)]. This model promises to bring the costs further down by utilising universities' in-house resources such as faculty, students, and infrastructure such as labs.

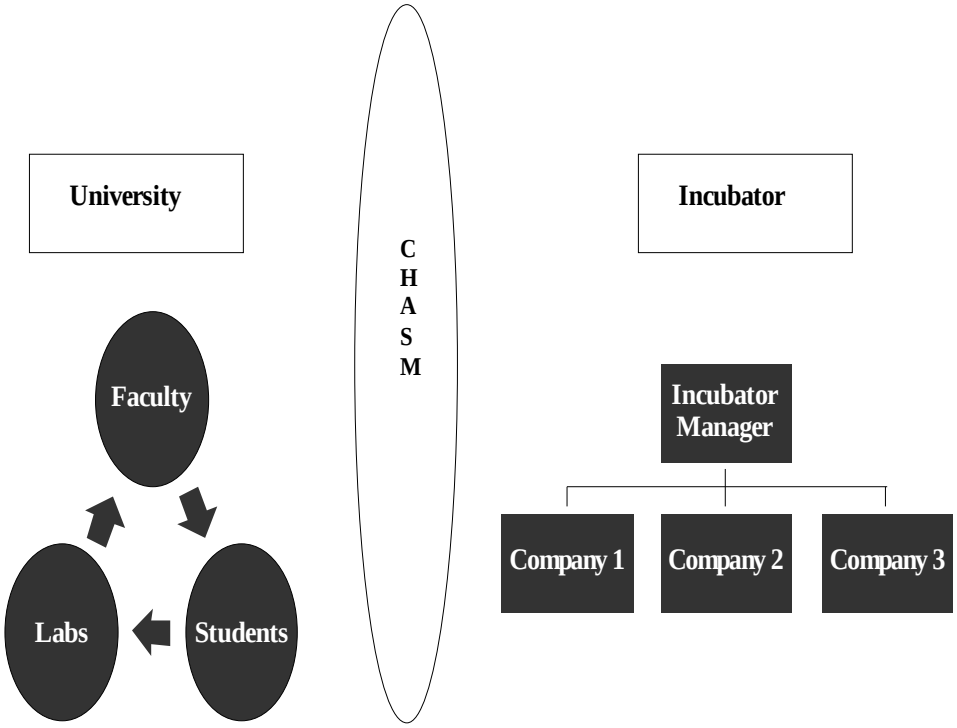
4. PROACTIVE INCUBATOR MANAGEMENT

In this paper, a new approach titled 'Proactive Incubator Management' which involves diversification of income resources of academic incubators by introducing project management teams, fully utilising in-house resources such as faculty, student interns, and laboratories offering financial incentives, and doing commercial development projects ensuring professional standards to address some of the major issues faced by the AIs today, is proposed. Although this idea is designed for an engineering/IT university environment, it could be implemented with minor changes to any universities offering natural sciences degrees.

4.1. Basic Idea

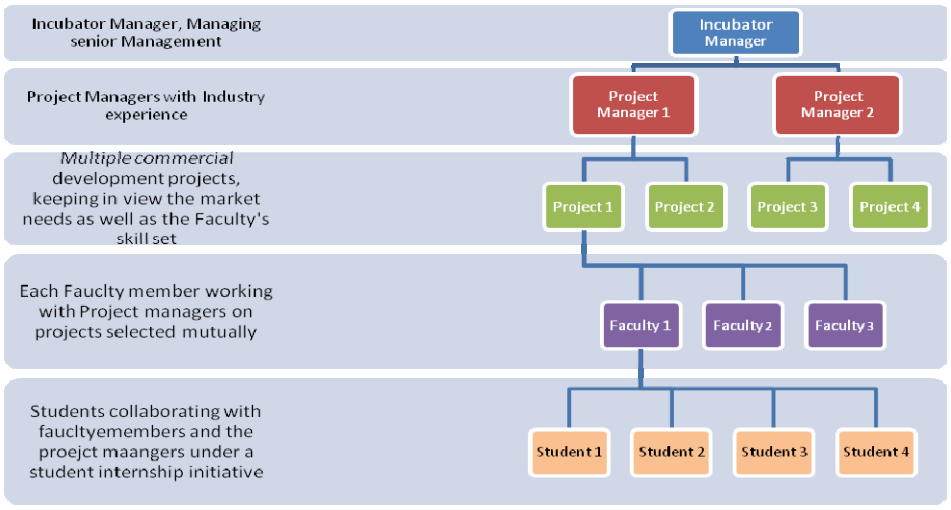
The present situation discussed above could be depicted in the Figure (2a) below which indicates that majority of the AIs exist in isolation from each other despite being located in same premises.

Fig. 2a. Present Situation



For the success of AIs, a new management layer is proposed in the incubator administration. This management team would report directly to the incubator manager, and manage multiple projects, involving the faculty as well as students. This organisational structure is depicted in the Figure (2b).

Fig. 2b. The Organisational Structure Depicting the Proposed Model



This approach would result in the integration of the underutilised resources mentioned in the beginning of discussion; faculty, students and the labs. The project managers would be able to connect these academic resources with the incubator managers, hence filling the chasm that currently exists between academic incubators and their academic institutions leading to what is called 'intrapreneurial synergy' (Figure 2c).

Fig. 2c. Intrapreneurial Synergy

4.2. Alignment of Academic Resources—University

4.2.1. *Mode of Engagement*

It is encouraged that universities become a share holder in these companies. The joint venture model would ensure active participation, interest and diversification of risks for both the incubation companies as well as the universities. But the companies should

not be administered directly by the universities for the sake of entrepreneurial element. The universities should recognise their traditional bureaucratic culture and the adverse effects it could have on the companies. The university should provide the companies with space, resources, assistance and access to its in-house resources including faculty, laboratories and students and then only monitor the performance of this whole activity, without indulging into day-to-day management of these companies.

4.2.2. *Benefits for the Universities*

Even with highly qualified faculty and considerable resources provided by the public sector, the IT/Engineering universities in Pakistan might lag behind in the areas of creativity and innovation. This model would bring the industry closer to the university and add academic creativity to it. The success of the companies would result in additional revenue streams for the universities as well. The spin-offs from the incubator would improve the IT/Engineering universities image as hubs of entrepreneurial activity. Moreover, the university would grow more aware as an organisation. "We reject majority of the commercial projects because we have only 80 percent of the skill set available in-house," remarks the Dean of the Institute of Space and Technology in Pakistan. Through this model, in-house resources can be fully utilised and complemented by hiring professionals from the market whenever and wherever required. It would be the job of the Project Managers (PMs) to hire and engage those professionals. Furthermore, an additional revenue stream would enable universities to become more independent, autonomous and market oriented, thus reducing their reliance upon government subsidies and grants. Universities would have a further advantage of having a very competitive faculty and incubating graduates with a very desirable skill set for the market. This would improve university's ratings and potential graduate candidates would be more attracted towards the participating universities.

4.3. Aligning Faculty's Incentives

4.3.1. *Mode of Engagement*

The faculty would submit its resumes and areas of interest along with its skill set to the PMs. The PMs would then look for compatible projects, plan their execution keeping the concerned faculty in the loop. The faculty members would also be required to submit their time availability details. Once the project execution begins, the faculty would be expected to participate in the process actively, taking leadership role, encouraging student involvement. The faculty's performance and activity level would be directly monitored by the PMs and the monetary payments would be made during and/or at the end of project. Despite being the intellectual leaders in the project, the faculty members would have to recognise the importance of market awareness and client satisfaction for the project success and thus would be expected to work in accordance with the instructions from the PMs.

4.3.2. *Benefits*

The primary concerns of the foreign qualified faculty returning to Pakistan include possible low pays and corrosion of their skill set due to the current stagnant cultures of

Pakistani universities and absence of an innovative domestic market. This model addresses both of these issues by first providing an extra revenue stream for the faculty members, and secondly, promising projects from competitive markets that would allow the participating faculty to continually update their skills and to have an awareness of the latest market activity. This would have a direct impact on the quality of research that they carry out.

4.4. Aligning Students Objectives

4.4.1. *Mode of Engagement*

Initially only final year students are expected to be involved in this model. During their final year projects/thesis, they would be expected to choose the projects going on in the incubators, in consultation with their project supervisors. Although the students are not expected to hold the equivalent skill set of professional engineers, they would be able to provide intermediate level skills. They would be paid for their work and at the end of the projects, would receive certifications/ recommendations for their involvement.

4.4.2. *Benefits*

Market is usually reluctant to hire fresh graduates due to the fear of irrelevant skill set and thus additional costs associated with hiring them. This model addresses those concerns by making sure that the graduates have competitive skills, would have worked on professional projects during their degrees and would have been taught by the faculty with an updated skill set. The participating students would be paid and would also receive certifications/recommendations of intermediate skill set. This would provide the students with an additional revenue stream, improving their access to higher education. Moreover, it would improve their employment chances.

By and large this apprenticeship programme would improve the quality of Pakistani IT workforce, leading to lower unemployment rates. Many developed countries, such as Germany owe their AI success stories partly to similar nationwide apprenticeship programmes. If implemented successfully, this model would turn the incubators into vocational laboratories for the students.

4.5. Aligning Incubators' Objectives

4.5.1. *Modes of Operation*

The incubators would be university-affiliated but not university-administered. They would be located inside the university premises, either as a separate building or having a completely independent space, such as a few floors in one of the university buildings. Their organisational structure has been depicted in the Figure 2b. The incubator would be primarily managed by the incubator manager (IM). IM would be responsible for senior level management, selecting incubating companies, matching their objectives with the university's vision, garnering political support for the incubator, hiring and monitoring Project Managers (PMs), and making sure that the incubator does not fall into the trap of mere real-estate management.

The second layer of management would be comprised of Project Managers (PMs) hired from the market, based upon their sales, marketing and project management skills. This is a people-intensive activity therefore would require a thorough appreciation of the 'human element' in the success of the projects by the PMs. The university culture is very different from the market and even though academia prepares the future professionals and leaders for the market, a huge chasm exists between these two entities. This model intends to bridge this gap, and the building elements of this bridge would be these PMs. They will recognise the differences and the opportunities existing in both environments and then construct an ecology where a mutual compromise is achieved, ensuring maximum gain for all the stakeholders.

One of the main reasons behind Pakistani universities' stagnation is the employment structure where it is virtually impossible to fire any worker. This stagnation would be addressed by the continual evaluation of the PMs whose incentives would be based upon the performance of their projects and the revenue generated from them. Therefore, it is the sole responsibility of the PMs to make sure that projects are successfully, ensuring quality, timely completion and budget constraints. Any PM who fails to assimilate into this environment would be let go.

4.5.2. *Benefits*

Currently, many AIs in the United States (and even in Pakistan) are facing problems due to financial constraints and their inability to integrate with university culture. The sources of revenue are either the rent from the tenants or the grants from their parent organisation. This results in their inability to sift through the list of companies which desire to locate themselves in the incubator, and thus end up choosing companies based upon their ability to pay rents rather than their growth potential or the relevancy of those companies with the university's objectives. Moreover, the reliance on grants results in requirement of political support and political compromises. All these factors result in a dormant, real-estate focused incubator, becoming a poor model for the incubating companies.

The model proposed in this study promises alternative revenue streams for the incubators, by making incubators active partners in the incubating companies. Incubator management is to be actively involved in the selection, execution and completion of the projects that would be carried out in the incubators, thus eliminating the gaps and the lack of interest between incubator managers and the incubating companies. Moreover, the incentives of the incubator managers would be based upon the success of these projects, thus aligning the incubator sustainability with the manager's retention and promotion.

Furthermore, the incubators would be selecting the projects that are aligned with the universities, their faculty's skill set, student objectives, and lab resources. Thus, the projects that would be brought in would be closely aligned with the areas where university is working, thus automatically resulting in political support for the incubator and hence saving incubator manager's valuable time for enterprise development activities.

5. CONCLUSION

Knowledge Process Outsourcing (KPO) is an emerging trend in which intensive information-related, knowledge-related, or judgment-related business services demanding

advanced technical and analytical skills and judgments, are outsourced by major companies to individuals in a different company or in a subsidiary of the same company, located in the same country or in another country in order to save money. This is considered high-value work carried out by extremely specialised experts and hence different from the business process outsourcing (BPO) industry in that the subsidiary or contracted companies are part of the value chain [Aggrawal (2007)].

BPO began in the 1990s and focused on relatively elementary and standardised processes. KPO on the other hand, focuses on highly skilled activities which were traditionally considered part of a company's competitive advantage or core activities. The defining difference between BPO and KPO is that KPO is usually focused on knowledge-intensive business processes that require significant domain expertise. The global KPO market is expected to grow at a cumulative annual growth rate (CAGR) of 46 percent, to $17 billion in 2010. Some of the growing areas of KPO include engineering designs, pharmaceutical, biotechnology research, analytical services such as equity research and financing research, and market research. Most of the KPO service providers are located in countries such as India, Russia, Israel and China and employee professionals like lawyers, MBA graduates, scientists and engineers.

Because of the presence of such highly qualified faculty in the Pakistani universities, an opportunity exists for Pakistan to explore and attempt to claim its due share in this emerging market and the academic incubator model being proposed could be a means to this endeavour. Since the main driver of the KPO industry is highly qualified human resource, Pakistani faculty could be connected with this industry through incubators. As there is presently a shortage of venture capitalists in Pakistan, an access to KPO industry could provide start-up companies in the incubators with the necessary financing as well as market which is growing very fast and faces a shortage on the supply side.

The recent efforts by the Pakistani government to encourage FDI in IT sector have started to show positive results. Pakistan has become the 20th most attractive outsourcing destination [PSEB (2007, 2009)]. An increasing number of IT universities, their active incubators, growing local IT industry and an emerging trend could be merged together to improve the exports, employment and knowledge-base of the country.

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